

Confirmation No. 5345

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	FAN, Y.	Examiner:	Le, Dinh T.
Serial No.:	10/570,050	Group Art Unit:	2816
Filed:	February 27, 2006	Docket No.:	US030282US2 (NXPS.276PA)
Title:	METHOD AND SYSTEM FOR PASSBAND RIPPLE CANCELLATION IN CASCADING FILTERS		

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APPEAL BRIEF

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Commissioner For Patents  
P.O. Box 1450  
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Customer No. <b>65913</b>
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Dear Sir:

This Appeal Brief is submitted pursuant to 37 C.F.R. §41.37, in support of the Notice of Appeal filed May 11, 2009 and in response to the rejections of claims 1-6, 9-18 and 21-25 as set forth in the Final Office Action dated February 26, 2009.

**Please charge Deposit Account number 50-4019 (US030282US2) \$540.00** for filing this brief in support of an appeal as set forth in 37 C.F.R. §1.17(c). If necessary, authority is given to charge/credit Deposit Account 50-0996 additional fees/overages in support of this filing.

**I. Real Party In Interest**

The real party in interest is NXP Semiconductors. The application is presently assigned of record, at reel/frame nos. 019719/0843 to NXP, B.V., headquartered in Eindhoven, the Netherlands.

**II. Related Appeals and Interferences**

While Appellant is aware of other pending applications owned by the above-identified Assignee, Appellant is unaware of any related appeals, interferences or judicial proceedings that would have a bearing on the Board's decision in the instant appeal.

**III. Status of Claims**

Claims 1-6, 9-18 and 21-25 stand rejected and are presented for appeal. Claims 7-8 and 19-20 are cancelled. A complete listing of the claims under appeal is provided in an Appendix to this Brief.

**IV. Status of Amendments**

No amendments have been filed subsequent to the Final Office Action dated February 26, 2009.

**V. Summary of Claimed Subject Matter**

As required by 37 C.F.R. § 41.37(c)(1)(v), a concise explanation of the subject matter defined in the independent claims involved in the appeal is provided herein. Appellant notes that representative subject matter is identified for these claims; however, the abundance of supporting subject matter in the application prohibits identifying all textual and diagrammatic references to each claimed recitation. Appellant thus submits that other application subject matter, which supports the claims but is not specifically identified above, may be found elsewhere in the application. Appellant further notes that this summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

Commensurate with independent claim 1, an example embodiment of the present invention is directed to a composite filter (*see, e.g.*, filter 200 shown in Fig. 2, and page 3:12-

17) comprising an electronic circuit including at least two cascading filters of different orders (*see, e.g.*, filters 202 and 204 shown in Fig. 2, and page 3:12-17) and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize a passband ripple in the composite filter (*see, e.g.*, page 4:3-8), wherein the orders of the two cascading filters differ in value by exactly one (*see, e.g.*, page 3:18-24).

Commensurate with independent claim 11, an example embodiment of the present invention is directed to a method for passband ripple cancellation in cascading filters to minimize a passband ripple in a composite filter (*see, e.g.*, filter 200 shown in Fig. 2, and page 3:12-17) comprising the steps of: providing, in an electronic circuit, at least two filters of different orders (*see, e.g.*, filters 202 and 204 shown in Fig. 2, and page 3:12-17) and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize the passband ripple in the composite filter (*see, e.g.*, page 4:3-8), wherein the orders of the two cascading filters differ in value by exactly one (*see, e.g.*, page 3:18-24).

## **VI. Grounds of Rejection to be Reviewed Upon Appeal**

The grounds of rejection to be reviewed on appeal are as follows:

- A. Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 stand rejected under 35 U.S.C. § 103(a) over Hwang (U.S. Patent No. 6,678,511).
- B. Claims 3, 13 and 22-23 stand rejected under 35 U.S.C. § 103(a) over Hwang in view of Chan (U.S. Patent No. 6,920,471).

## VII. Argument

### **Overview: In Attempting To Use An Obvious-To-Try Argument, The § 103 Rejections Contradict Both The Patent Law And The Evidence That The '511 Reference Teaches Away From The Examiner's Asserted Modification**

The § 103 rejections are based on a "routine experimentation" or "obvious to try" assertion that ignores the teaching-away evidence and contradicts one of the two situations, as explained in *In re Kubin*, in which the "obvious to try" standard may not be applied.

The Examiner acknowledges that the asserted '511 reference does not expressly teach the invention as a whole, including aspects of the claimed invention that address the problem of having passband ripples carried through a circuit by implementing a composite filter that includes, among other aspects, two cascading filters having orders that differ by exactly one. In stark contrast, the Examiner asserts an embodiment from the '511 reference that includes cascading filters having respective orders of nine and two or four, with teaching that optimization would be achieved, not by adjusting the orders of the filters, but rather by adjusting aspects of the amplifier and attenuator circuits in the Examiner's relied-upon embodiment. The Examiner provides no reason why the skilled artisan would be led along such a divergent research path involving entirely different parameters (adjustments to the filters as opposed to amplifier and attenuator circuits) and encompassing an unlimited number of possible combinations (involving all possible combinations of orders for the filters) of which the prior-art record provides a hint of success only for the respective orders of nine and two or four.

Accordingly, the Examiner's § 103 rejections are contrary to key principles in the patent law including:

- When the prior art teaches away by leading in a direction divergent from the path that was taken by the applicant, "discovery of a successful means of combining them is more likely to be non-obvious." *See KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007); *In re Kubin* (Fed. Cir. April 3, 2009), *citing In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994).
- The "obvious to try" standard may not be applied where one would have "to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful." *In re Kubin* (Fed. Cir. April 3, 2009), *interpreting KSR*. See also M.P.E.P. § 2143(E), and *Gillette Co. v. S.C. Johnson & Son, Inc.*, 919

F.2d 720, 725 (Fed. Cir. 1990) ("we have consistently held that 'obvious to try' is not to be equated with obviousness.").

As explained in more detail below, the Examiner's rejections are improper.

**A. The § 103(A) Rejections Are Improper Because The  
'511 Reference Does Not Disclose Two Cascading  
Filters Having Orders That Differ By Exactly One**

The '511 reference, as acknowledged by the Examiner, does not teach that the orders of the filters differ by exactly one, as claimed. Instead, the only concrete examples provided by the '511 reference show filters having orders that differ by significantly more than one (*e.g.*, 9 stage and 2 or 4 stage). *See, e.g.*, Col. 4:64 to Col. 5:16. The Examiner then erroneously concludes that these aspects of the claimed invention are obvious because routine experimentation would have lead the skilled artisan to select filters having orders that differ by exactly one in the '511 reference. The evidence put forth by the Examiner is little more than a conclusion that orders of the filters differing by exactly one is an obvious design choice to reach a condition which is "optimum" for some unspecified end goal.

Moreover, as explained in *In re Kubin*, the "obvious to try" standard may not be applied in situations (such as here) where one would have "to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful." *See also* M.P.E.P. § 2143(E) (a requirement for showing that a combination of elements is obvious to try is that there are a finite number of identified, predictable potential solutions). The '511 reference does not provide any direction as to which of the infinite number of filter order combinations is likely to be successful. Instead, the only working filter examples shown by the '511 reference deal with a specific concave-shaped ripple that is taught by the '511 reference to be adjusted by varying the parameters of attenuator and amplifier circuits, not by varying the orders of the filters. In view of this limited disclosure, the Examiner has not provided evidence that suggests that experimentation with such ripple characteristics would lead the skilled artisan to filters differing by exactly one and the '511 reference does not provide any direction for the skilled artisan to experiment with the orders of the filters. Thus, the experimentation

suggested by the Examiner is an improper application of the “obvious to try” standard which would unduly include trying each of numerous possible choices of filter orders with no direction as to which of the many possible choices is likely to be successful.

For example, the Examiner’s reasoning would be applicable to an infinite number of filter combinations because the Examiner’s logic has no reliance upon teachings of the actual order of the filters. If Appellant had discovered that using filters differing in order by twenty or sixty or one million, the Examiner’s argument would not change. For example, the evidence of record is the same had the Examiner instead stated that selecting the optimum number for the second filter of the ‘511 reference to have the order difference of twenty or sixty or one million for the purpose of cancelling all of the ripples within the passband of the first filter is considered to be a matter of design expedient for the engineer depending on the ripples of the first filter that would have been obvious at the time of the invention. No evidence is provided to suggest how a skilled artisan would work toward reaching the Examiner’s conclusion. For the Examiner to maintain the rejection on the evidence provided, the Examiner would have to conclude that an infinite number of filter combinations are obvious in view of only a few concrete filter circuit examples.

For at least the aforementioned reasons, Appellant respectfully submits that the rejections are improper and requests that they be withdrawn.

**B. The ‘511 Reference Teaches Away From Filters That Have Orders That Differ By Exactly One**

The ‘511 reference teaches away from experimentation involving the orders of the filters 20 and 12 as proposed by the Examiner. Consistent with the recent Supreme Court decision, M.P.E.P. § 2143.01 explains the long-standing principle that a §103 rejection cannot be maintained when the asserted modification undermines either the operation or the purpose of the main (‘511) reference - the rationale being that the prior art teaches away from such a modification. *See KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007) (“[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious.”). In this instance, the ‘511 reference teaches that the impact of the counter-ripple is adjusted, not by

experimentation with the orders of the filters 20 and 12, but by using the taught orders of the filters (*e.g.*, 9 stage and 2 or 4 stage) and varying other parameters such as the gains of the filter 12 and the amplifier circuit 11 and the attenuation characteristic of the first attenuator circuit 13. *See, e.g.*, Figure 4c and Col. 5:47-55. The '511 reference further teaches additional embodiments that involve adjusting the counter-ripple by varying parameters of amplifier 11 and attenuators 13 and 14. *See, e.g.*, Col. 6:35-63. Thus, the '511 reference teaches adjusting the counter-ripple to correct the whole pass band flatness of the band pass filter by experimenting with parameters of amplifier and attenuator circuits, not by experimentation with the orders of the filters. As such, the '511 reference expressly teaches away from experimentation involving changing the orders of the filters. Accordingly, there is no motivation for the skilled artisan to modify the '511 reference in the manner proposed by the Examiner.

For at least the aforementioned reasons, Appellant respectfully submits that the rejections are improper and requests that they be withdrawn.

**C. Appellant's Disclosure Is The Only Evidence Of Record That Teaches That Filters Differing By Exactly One Would Be Advantageous**

The Examiner has impermissibly used Appellant's teachings as the basis for the conclusion of obviousness. In this instance, the Examiner's assertions regarding routine experimentation require that the skilled artisan impermissibly work backward from Appellant's specification. The Examiner circularly requires that the skilled artisan realize that filters differing in order by exactly one provide the advantageous features taught only by Appellant's specification. Absent Appellant's specification, there is nothing in the record that would suggest to the skilled artisan that filters differing by exactly one would be advantageous. Thus, Appellant respectfully submits that the rejections are improper and requests that they be withdrawn.

**D. The Examiner's Reliance Upon Routine Experimentation Is Improper**

The Examiner has improperly relied upon routine experimentation to support the conclusion of obviousness without first establishing that the prior art discloses an overlapping range. In order to rely upon routine experimentation to assert obviousness, the Examiner must first establish that the prior art discloses an overlapping range. *See, e.g.*, M.P.E.P. § 2144.05 ("In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."). In this instance, the '511 reference only discloses a few exact implementations of the orders of the filters and does not otherwise disclose a range (leaving an infinite number of possibilities for the skilled artisan to experiment with), thus there is not any evidence of an overlapping range.

Moreover, any presumption of obviousness of ranges has been rebutted by the criticality of the claim limitations taught by Appellant's specification. As discussed in M.P.E.P. § 2144.05, even where there are overlapping ranges, the obviousness can be rebutted by a showing of criticality. Appellant's disclosure teaches that implementing a composite filter with orders of filters differing by exactly one is a critical aspect of the claimed invention. The surprising results of this specific configuration are shown in Tables 1-3. Appellant has therefore rebutted any showing of obviousness due to overlapping ranges. Accordingly, the '511 reference does not render the claimed invention obvious and the rejections must be withdrawn.




**VIII. Conclusion**

In view of the above, Appellant submits that the rejections of claims 1-6, 9-18 and 21-25 are improper and therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

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**APPENDIX OF CLAIMS INVOLVED IN THE APPEAL**  
(S/N 10/570,050)

1. A composite filter comprising an electronic circuit including at least two cascading filters of different orders and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize a passband ripple in the composite filter, wherein the orders of the two cascading filters differ in value by exactly one.
2. A composite filter as claimed in claim 1, characterized in that the magnitude of the passband ripples in the at least two cascading filters are equal.
3. A composite filter as claimed in claim 1, characterized in that at least one of the at least two cascading filters includes a digital filter.
4. A composite filter as claimed in claim 1, characterized in that at least one of the at least two cascading filters includes an analog filter.
5. A composite filter as claimed in claim 1, characterized in that at least one characteristic of the at least two cascading filters is selected to minimize the passband ripple in the composite filter.
6. A composite filter as claimed in claim 5, characterized in that the at least one characteristic includes the order of the at least two cascading filters.
9. A composite filter as claimed in claim 5, characterized in that the at least one characteristic includes a bandwidth of the at least two cascading filters.

10. A composite filter as claimed in claim 5, characterized in that the at least one characteristic includes a stopband attenuation of the at least two cascading filters.

11. A method for passband ripple cancellation in cascading filters to minimize a passband ripple in a composite filter comprising the steps of: providing, in an electronic circuit, at least two filters of different orders and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize the passband ripple in the composite filter, wherein the orders of the two cascading filters differ in value by exactly one.

12. A method as claimed in claim 11, characterized in that the magnitudes of the passband ripples in the at least two cascading filters are equal.

13. A method as claimed in claim 11, characterized in that at least one of the at least two cascading filters includes a digital filter

14. A method as claimed in claim 11, characterized in that at least one of the at least two cascading filters includes an analog filter.

15. A method as claimed in claim 11, characterized in that at least one filter characteristic for the at least two cascading filters is selected to minimize the passband ripple in the composite filter.

16. A method as claimed in claim 15, characterized in that the at least one filter characteristic includes a bandwidth for the at least two cascading filters.

17. A method as claimed in claim 15, characterized in that the at least one filter characteristic includes a stopband attenuation for the at least two cascading filters.

18. A method as claimed in claim 15, characterized in that the at least one filter characteristic includes an order for the at least two cascading filters.
21. The composite filter of claim 1, wherein one filter of the two cascading filters is a third order filter and another filter of the two cascading filters is a fourth order filter.
22. The composite filter of claim 1, wherein at least one of the cascading filters is an infinite impulse response filter.
23. The composite filter of claim 1, wherein at least one of the cascading filters is a finite impulse response filter.
24. The method of claim 11, wherein the step of providing in an electronic circuit at least two filters is implemented such that the combined frequency response of the at least two filters has a peak ripple less than about 0.10 dB at around 7.8 MHz.
25. The method of claim 11, further including the step of performing a low-pass to bandpass transformation on each of the at least two filters.

## **APPENDIX OF EVIDENCE**

Appellant is unaware of any evidence submitted in this application pursuant to 37 C.F.R. §§ 1.130, 1.131, and 1.132.

## **APPENDIX OF RELATED PROCEEDINGS**

As stated in Section II above, Appellant is unaware of any related appeals, interferences or judicial proceedings.